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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/590,716	04/26/2007	Alan Massey	3003-1134-1	2577

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YOUNG & THOMPSON
209 Madison Street
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Alexandria, VA 22314

EXAMINER

KREINER, MICHAEL B

ART UNIT	PAPER NUMBER
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3644

NOTIFICATION DATE	DELIVERY MODE
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10/06/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DocketingDept@young-thompson.com

Office Action Summary	Application No. 10/590,716	Applicant(s) MASSEY ET AL.	
	Examiner Michael Kreiner	Art Unit 3644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-9 and 11-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-9 and 11-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Double Patenting

Applicant is advised that should claims 4 and 5 be found allowable, claims 9 and 11, respectively, will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof.

When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Application Pub. No. 2002/0158167 to Schmutz *et al.* ("Schmutz").

Regarding claim 1, Schmutz teaches an aircraft fuel tank system comprising: at least one aircraft fuel tank 12; an air separation device 4 producing nitrogen-enriched air, and a control device 14 operable to control said air separation device to supply nitrogen-enriched air into said at least one aircraft fuel tank during cruise conditions and to supply nitrogen-enriched air at a higher flow rate during descent (Abstract, ¶32-33), whereby the whole of the mass of gas required to maintain the pressure difference across the walls of the fuel tank below a predetermined threshold is provided by said air separation device, without inward venting of

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ambient air. (The control device is operable to sense the pressure difference between the tank and ambient pressure and send a control signal 16 for controlling the flow rate in response to this signal ¶33-34. If the predetermined threshold corresponds to the pressure of gas in the tank being greater than ambient pressure, then the device is operable to supply NEA at a mass flow rate sufficient to maintain this tank pressure above ambient pressure during the descent, thereby preventing ambient fluid from passing from a location of lower pressure outside the aircraft to a location of higher pressure inside the tank.)

Regarding claim 3, Schmutz teaches that said air separation device in use provides nitrogen-enriched air having a high concentration of nitrogen at low mass flow rates, and a low concentration of nitrogen at high mass flow rates, wherein said high concentration is higher than said low concentration, and said high mass flow rate is higher than said low mass flow rate (Abstract).

Claims 6 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,556,180 to Manatt.

Manatt teaches an aircraft fuel tank system comprising: at least one aircraft fuel tank 12a, 12b; a source providing nitrogen-enriched air for delivery into said at least one tank 14, and a distribution network distributing said nitrogen-enriched air at a number of spaced locations within said at least one tank (feed lines 18n). The entire amount of nitrogen-enriched air (as opposed to the entire amount of air necessary to maintain the fuel tank at a pressure above ambient pressure) is drawn from said providing source providing nitrogen enriched air (fig. 2). N.B.—Manatt teaches other aspects of Applicant's invention, i.e. that during descent, the entire

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mass of air required to maintain the tank pressure above the ambient fluid pressure (so that there is no inward venting) is provided by the NEA supply (col. 4 *l.* 45-58).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-5, 9, 11, and 13 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Manatt.

Regarding claims 1, 5, and 11, Manatt teaches an aircraft fuel tank system comprising: at least one aircraft fuel tank 12a, 12b; a hollow fiber membrane (col. 2 *l.* 54-57) air separation device 14 producing nitrogen-enriched air (col. 3 *l.* 10-12), and a control device 64, 66 operable to control said air separation device to supply nitrogen-enriched air into said at least one aircraft fuel tank during cruise conditions and to supply nitrogen-enriched air at a higher flow rate during descent (col. 4 *l.* 55-58), whereby the whole of the mass of gas required to maintain the pressure difference across the walls of the fuel tank below a predetermined threshold is provided by said air separation device, without inward venting of ambient air (col. 4 *l.* 45-58). It is clear from the disclosure that the additional supply of gas required during descent (col. 4 *l.* 55-58) is provided by controlling the flow regulators 64. If, in the alternative, this feature is not considered inherent in Manatt's disclosure, it would have been obvious to one of ordinary skill in the art at the time

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of the invention to provide the extra flow using the flow regulators to increase flow, in order to maintain "repressurization of the tanks as required by the change in ambient pressure."

Regarding claims 4, 9, and 13, Manatt teaches a distribution network (openings 18n) distributing the nitrogen-enriched air at a number of spaced locations in said at least one aircraft fuel tank, thereby in use to reduce variations in concentration of nitrogen within said tank (fig. 2).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Manatt in view of Schmutz.

Manatt teaches a method of inerting at least one aircraft fuel tank which comprises operating an air separation device 14 during cruise conditions to deliver nitrogen-enriched air with a concentration of nitrogen at a low mass flow rate into said aircraft fuel tank (col. 4 *l.* 36-44), and operating said air separation device during descent conditions to deliver nitrogen-enriched air with at a high mass flow rate (col. 4 *l.* 55-58), whereby the air-separation device provides the whole of the mass of gas required to maintain the pressure difference across the walls of the or each fuel tank below a predetermined threshold, without inward venting of ambient air, and said high mass flow rate is higher than said low mass flow rate (col. 4 *l.* 49-58, which describes adding additional air which can be accomplished by increasing flow rate during descent, as discussed above with respect to teachings of Manatt pertaining to claim 1). Manatt teaches a device that controls the mixing of oxygen in the separation device (col. 2 *l.* 1-14, col. 3 *l.* 44 to col. 4 *l.* 4). Manatt fails to teach utilizing a higher concentration of nitrogen utilized during cruise and a lower concentration during descent. Schmutz teaches and inerting system that uses higher concentration, lower flow rate nitrogen enriched air during cruise and lower

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concentration, higher flow rate nitrogen enriched air during descent. It would have been obvious to one of ordinary skill in the art at the time of the invention to control the concentration of oxygen to use a lower concentration of nitrogen during descent as the mass flow rate has increased, thereby allowing a safe level of oxygen into the fuel tank, in order to allow for an efficiently minimized quantity of gas generation at cruise while allowing for a fully inerted fuel tank during descent (Schmutz ¶9 and 10).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schmutz as applied to claim 3 above, and further in view of Applicant admitted prior art or Manatt. Schmutz teaches that the air separation means includes parallel membranes (col. 3 *l.* 14-20). Schmutz fails to teach that the membranes are of a hollow fiber type. Applicant admits that it is known to separate air to make nitrogen enriched air using hollow fiber membranes (Applicant's Specification, p. 1 *l.* 14-18). Manatt teaches a hollow fiber membrane (col. 2 *l.* 54-57) air separation device 14 producing nitrogen-enriched air (col. 3 *l.* 10-12). It would have been obvious to one of ordinary skill in the art at the time of the invention to use hollow fiber membranes because they are a proven technology that efficiently creates nitrogen-enriched air.

Examiner Comments

It appears that Applicant's amendments are intended to overcome the optional inward venting of Schmutz. Further prior art that more clearly teaches descending without inwardly venting the fuel tank is discussed above with respect to the claims. Furthermore, it is noted that Applicant's claims do not exclude inward venting. An example of claim language that would exclude inward venting has been provided to assist the Applicant: "...a control device controlling said air separation device...to supply nitrogen-enriched air at a higher flow rate

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during descent, whereby the air separation device provides the whole of the mass of gas required to maintain the pressure of the fuel tank above the ambient pressure during said descent." If the pressure of gas in the tank is above the ambient pressure then the tank will not have inward venting, since gas does not move from a lower pressure to a higher pressure.

Were the Applicant to recite the negative limitation "without venting of ambient air" in such a way as to require that any fuel tank vent of Applicant's invention be a one-way outflow vent, it appears that the invention could not be practiced with any two-way fuel tank valve, such that if the NEA supply should fail, there would be no way to repressurize the fuel tank.

Response to Arguments

Applicant's arguments filed 3/16/10 have been fully considered but they are not persuasive. Applicant's arguments are directed to new limitations, and have been treated above with regards to the prior art.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. 3,788,039 to Bragg, U.S. Patent No. 3,628,758 to Nichols.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kreiner whose telephone number is (571)270-5379. The examiner can normally be reached on Monday-Friday 9am-5:00pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Collins can be reached on (571)272-6886. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. K./

Examiner, Art Unit 3644

/Tien Dinh/

Primary Examiner, Art Unit 3644